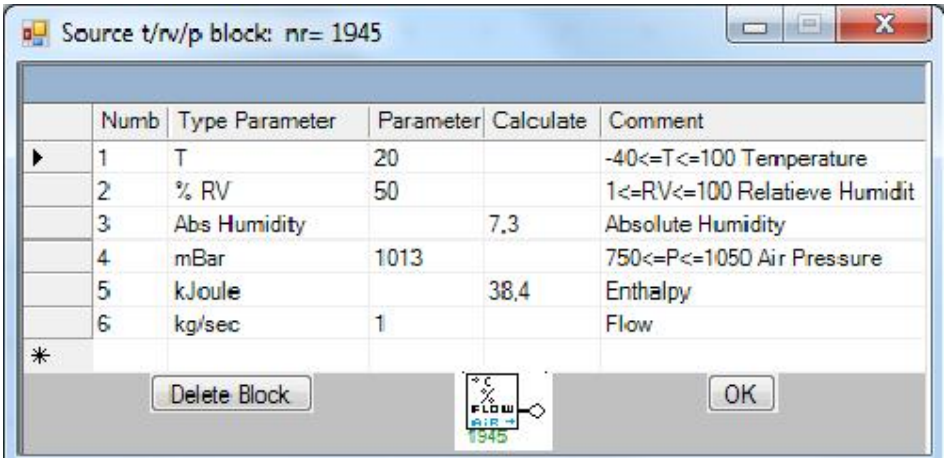
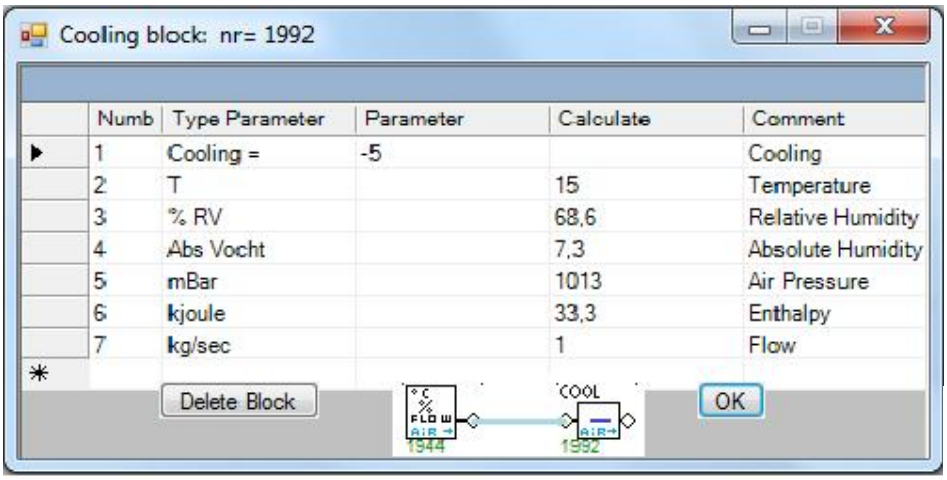
Manual Hvac_Simply version 6.00

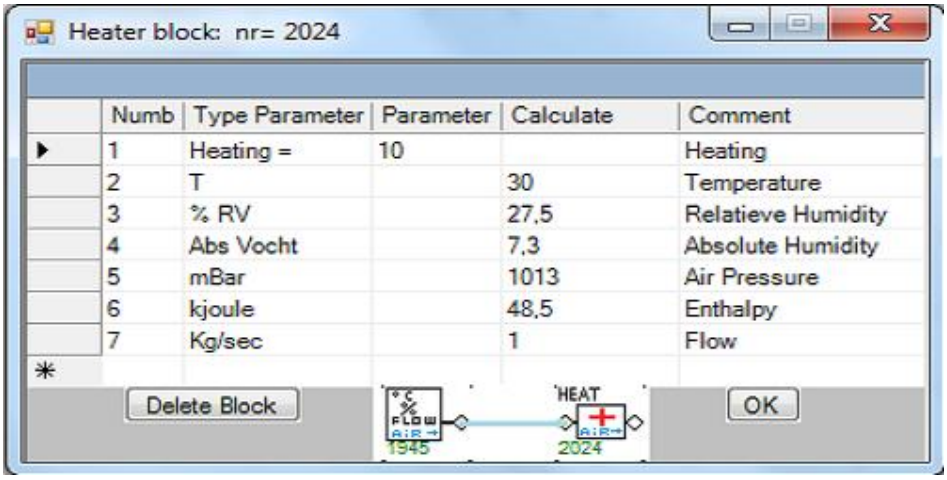
This is an indication of the main types of blocks that lets you build together to a model.



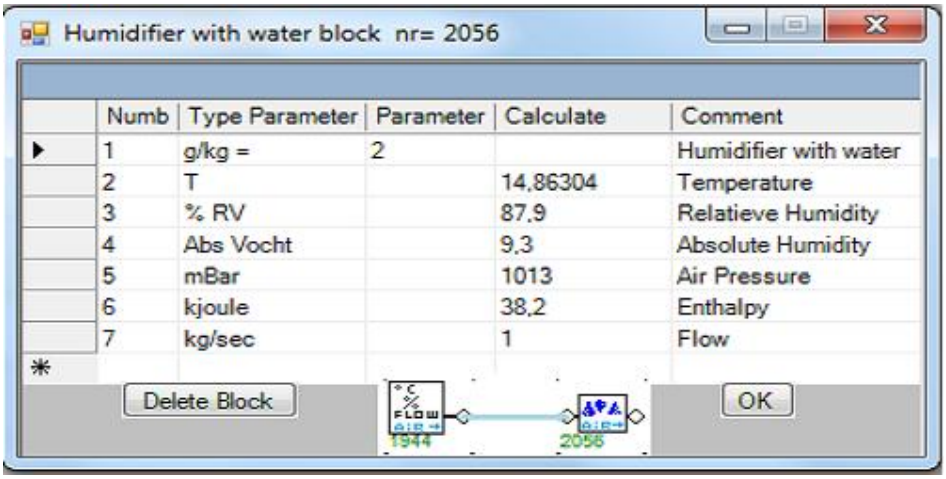
Block Source you can set different parameters.
The flow can be set. Everything under Title Type Parameter allows you to set temperature,% RH, Pressure and Flow. everything under Calculate calculated automatically.
The block has no input output only.



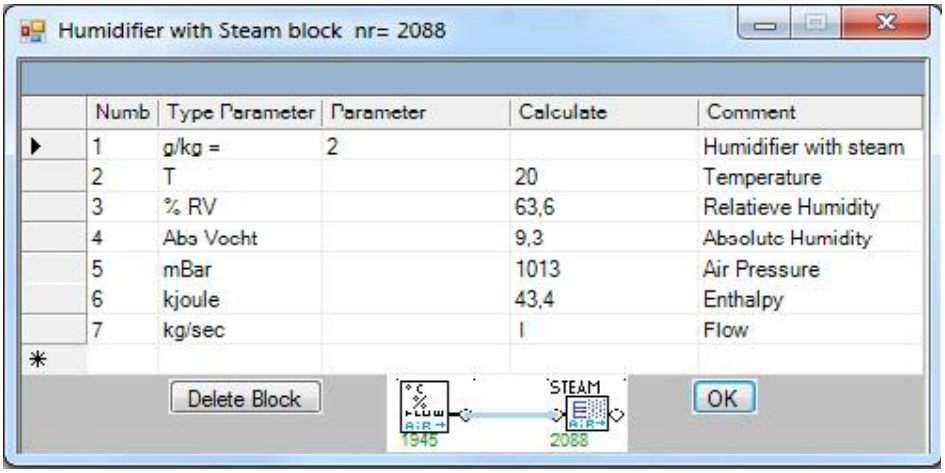
Block Parameter Cooling Cool that you can set how many degrees the air cooled to be.
Calculate everything is calculated automatically.
The block has 1 input and 1 output



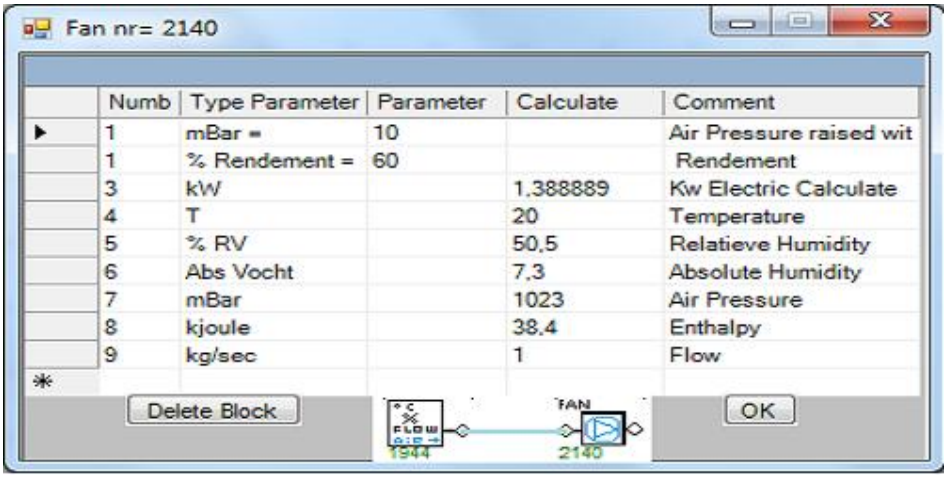
Block Parameter Heating Heat which you can set how many degrees the air must be heated the air must be heated be.
Calculate everything is calculated automatically.
The block has one input and one output.



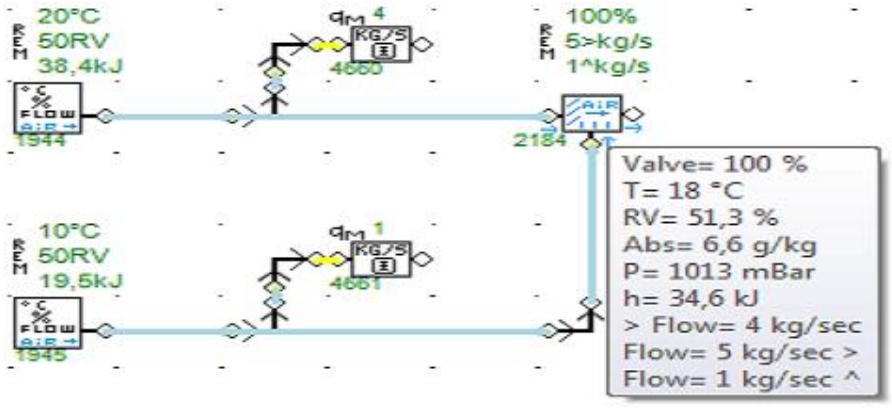
Block Humidifier allows you to Parameter g / kg = can set how many grams of water per kg air humidified air should be come. In this example you can see that the temperature drops from 25 degrees to 19.8 "C by extracting vapour heat absolute humidity increases from 7.3 to 9.3 and from 36.9% RH
to 64.3. Enthalpy of the air remains the same.
Calculate everything is calculated automatically.
The block has one input and one output.



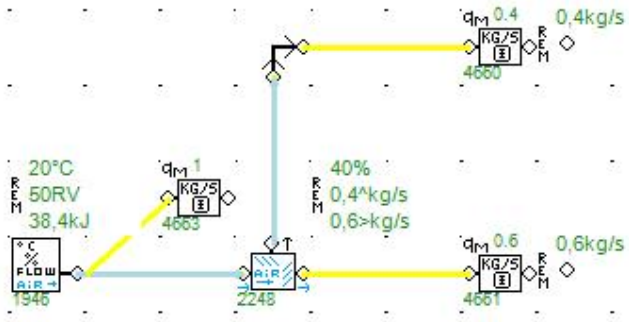
Block Humidifier allows you to Parameter g / kg = can set how many grams of water per kg air humidified air should worden.In this example you can see that the temperature drops from 25 degrees to 19.8 "C by extracting vapour heat.The absolute humidity increases from 7.3 to 9.3 and from 36.9% RH to 64.3. Enthalpy of the air remains the same.
Calculate everything is calculated automatically.
The block has one input and one output.



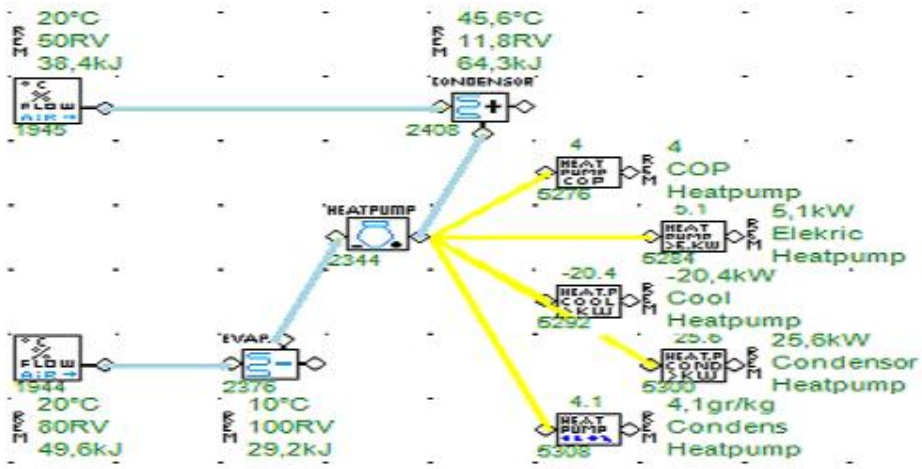
Fan unit with which you can set with Parameter = mBar how the pressure is increased
In this example you can see that the air pressure is increased from 1013 to 1023 mBar.
Everything under Calculate automatically calculated.Through change air pressure also changes %R.V a little. Look under calculate kw automatic calculate Power needed for the Fan: 1.38 kW.
The block has one input and one output.



Examples source 1944 for flow (4 kg / sec) 20'C is mixed with 1945 source flow (1 kg / sec) 10'C
Setting Parameter Mixer% = 100%.
This means 100% of source 1944 is = 4kg/sec source is mixed with 1945 (1 kg / sec)
Outcome 4kg/sec + 1kg/sec is 5 kg / sec. The temperature is now 18'C

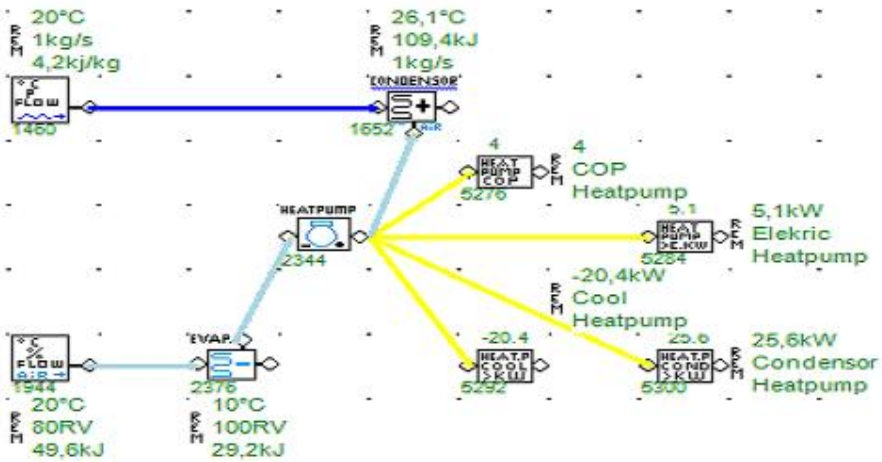


Block Split Air Valve



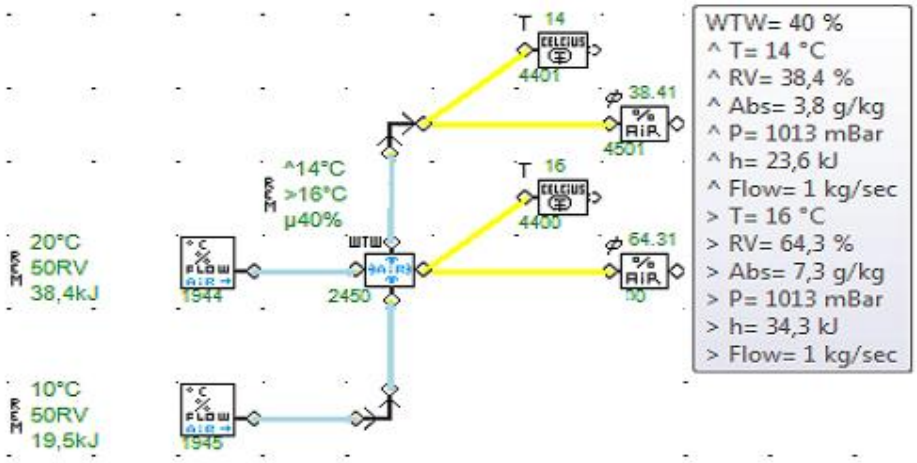
Applying Heatpump air

It consists of 3 parts evap (evaporator) heat pump (heat pump) and condenser.
They always have to be in a fixed manner connected with each other are shown in the following example.
The blocks:
Heat pump COP,: Coefficient of performence
Heat pump> E.kW: information supplied electrical energy
Heat pump Cool> kw: Evaporator cooling capacity
Heat pump Cond> kw: added heat Condenser



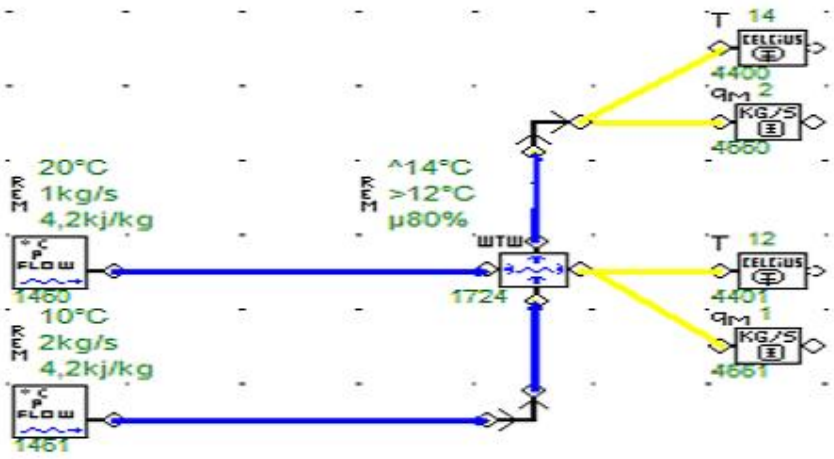
Applying Heatpump Air > Water

It consists of 3 parts evap (evaporator) heat pump (heat pump) and condenser.
They always have to be in a fixed manner connected with each other are shown in the following example.
The blocks:
heatpump COP,: Coefficient of performence
heatpump> E.kW: information supplied electrical energy
heatpump Cool> kw: Evaporator cooling capacity
heatpump Cond> kw: added heat to Water Condenser



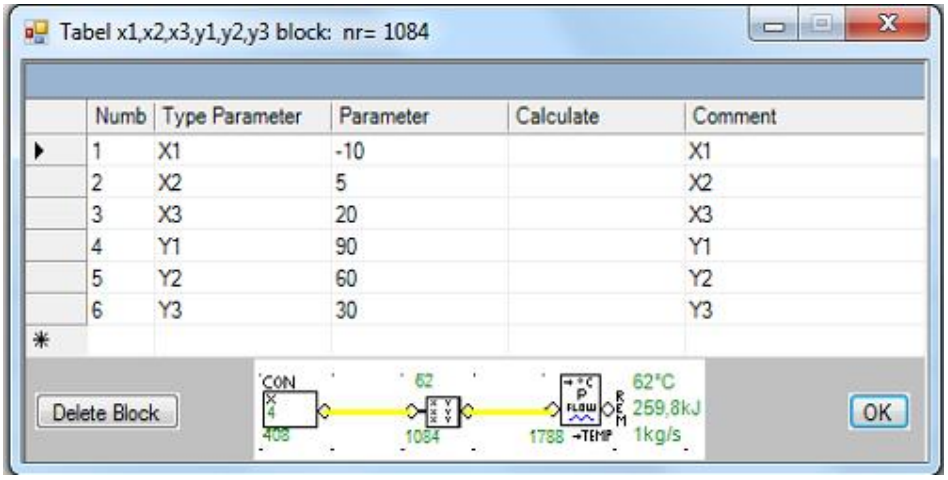
Heat Regeneration Air

Examples source 1944 20'C source 1945 10'C
Setting Parameter Profit% = 40
This can be Twincoil,Heatwheel,Crossflow etc
The block has two input and two output.



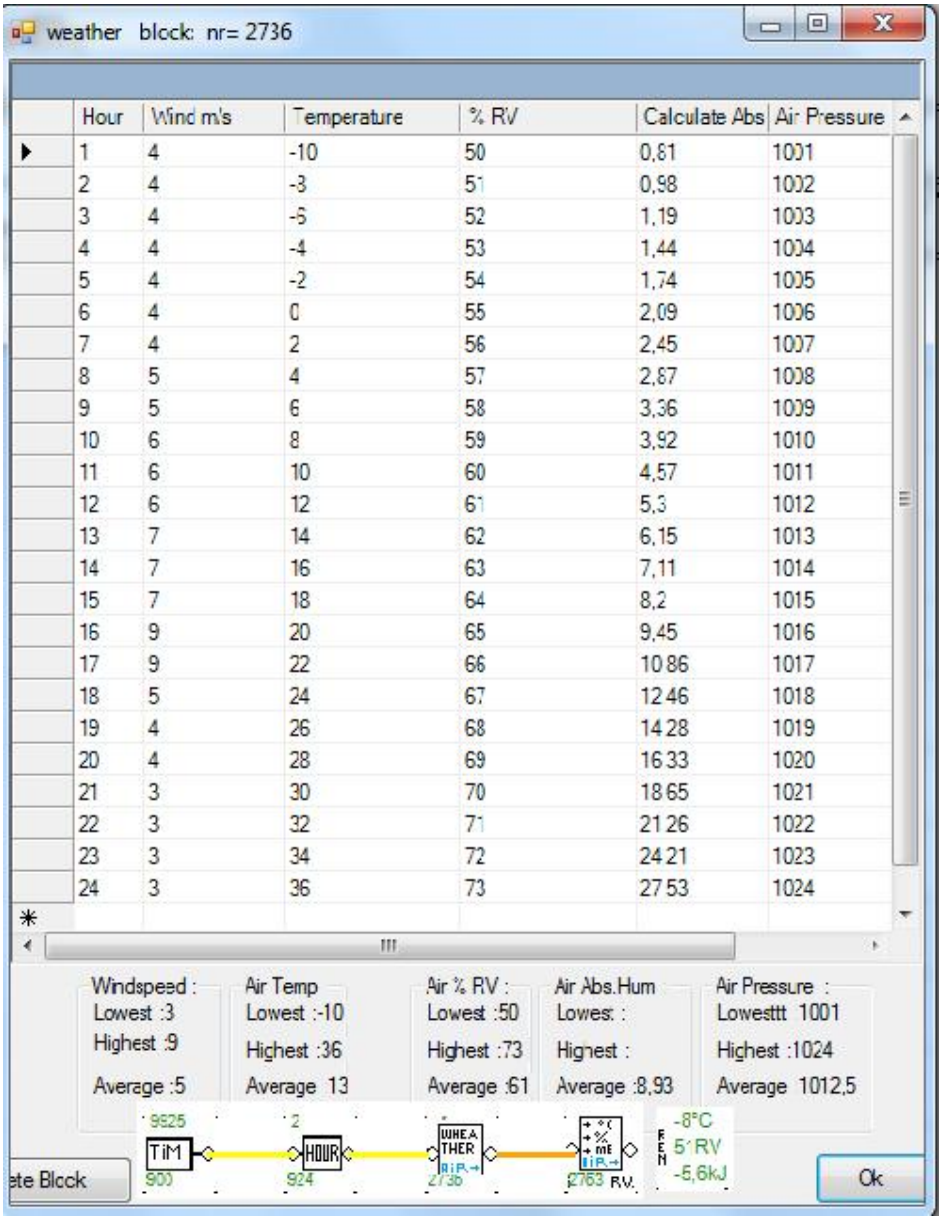
Heat Regeneration Water

Examples source 1460 1kg 20'C
Source 1461 2 kg 10'C
Setting Parameter Profit% = 80%
This can be ,Crossflow etc
The block has two input and two output.



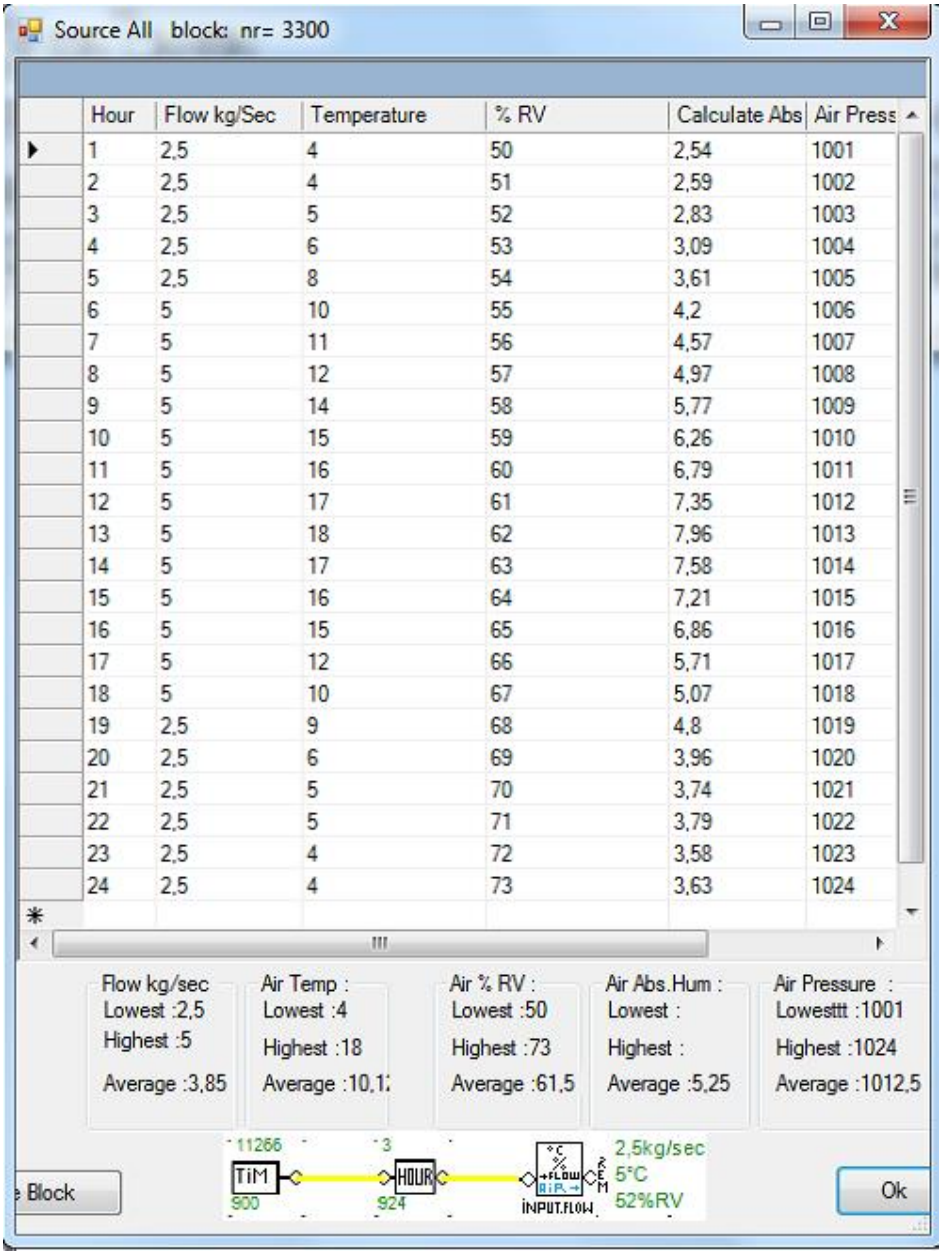
Tabel 3 input x 3 output y

Examples
To make a weather-dependent control Outside temp=4'C
Input tabel 4 then output 62
From this arithmetic block a line to Source with input Temp
You have now a compleet heating system
Also is a table block with 21 inputs and 21 outputs



Weather 24 Hour Simulation

Examples
To make a weather-depending systeem for different condition
From time > Hour then input wheather Block
From this arithmetic block a line to Source with input Weather
You have now a compleet simulation system
That you use as input for Air Connditioing Installation
Made with 4 blocks in a just a minute !



Input Condition Air 24 Hour Simulation

Example
To make a Time-depending systeem for different condition
From time > Hour then input Source All Block
From this arithmetic block a line to Source with input Source All
You have now a compleet simulation system
You can change the flow each hour
You use it as input for Air Conditioing Installation
Made with 4 blocks in a minute

Calculating with auxiliary blocks..

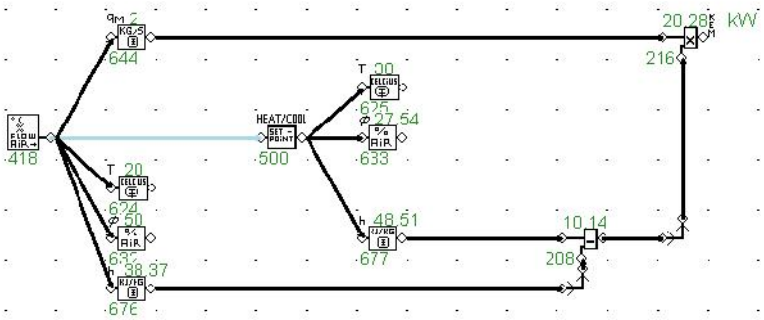
With block temperature  value you get from air temperature value

With block  you can get from air enthalpy value

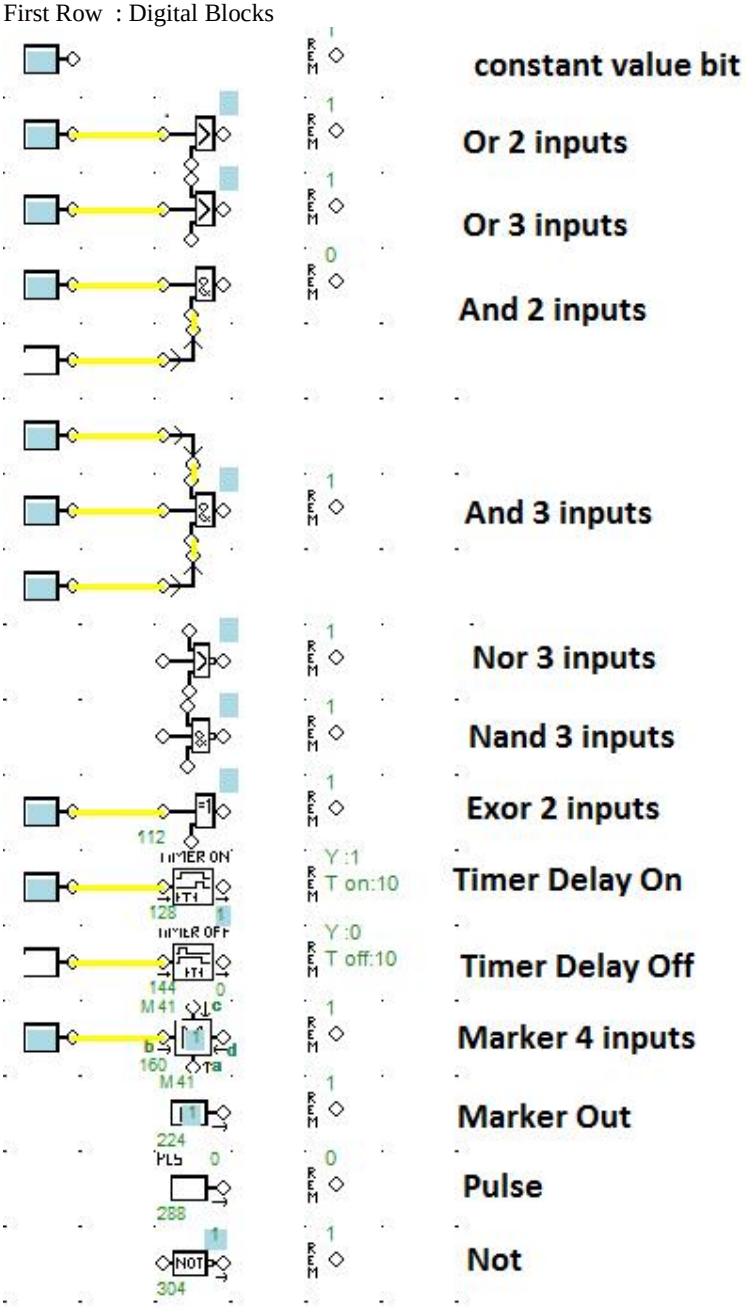
With block  you can air mass flow in kg / s

Sample mass flow rate * delta enthalpy represents power in kW. 2 * 10.14 = 20.28 kW

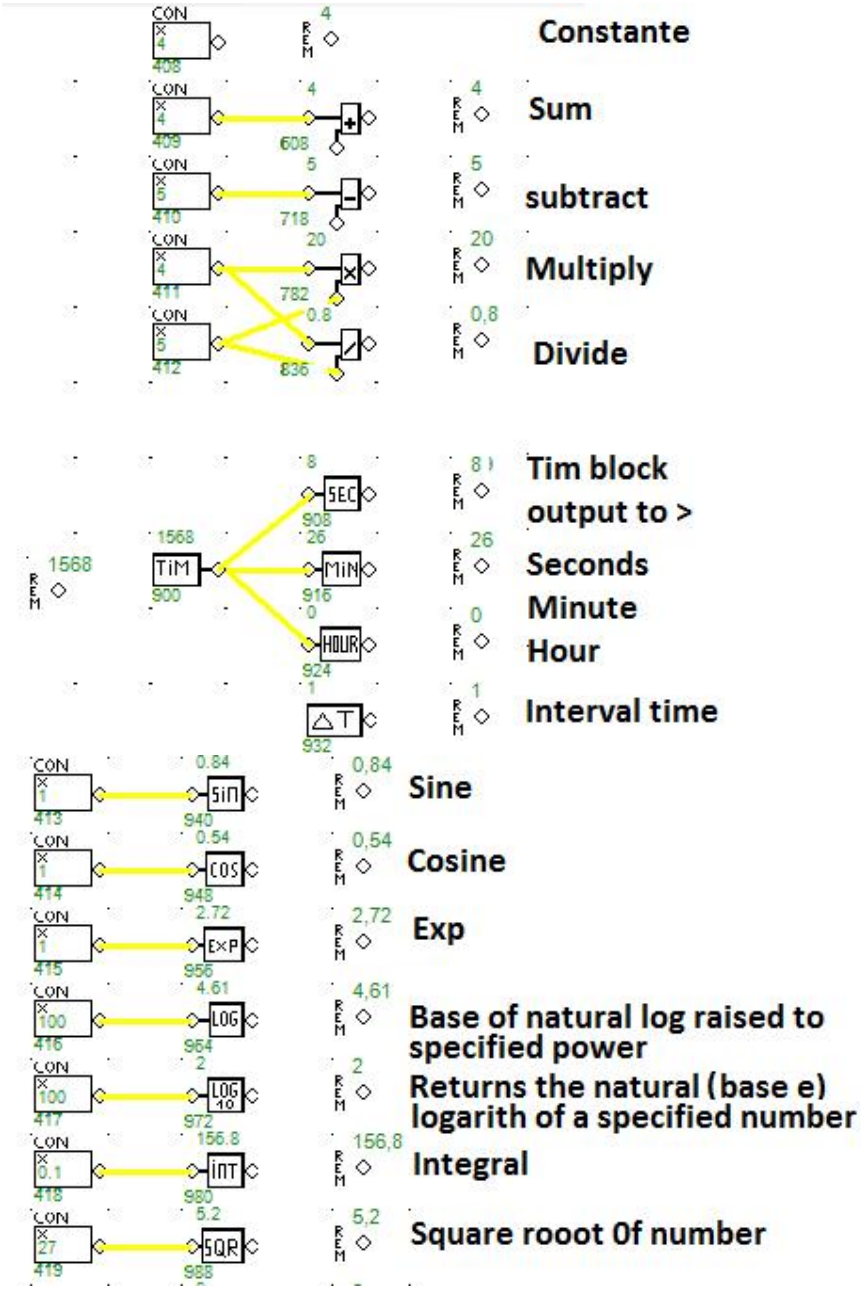
With REM you can add comments

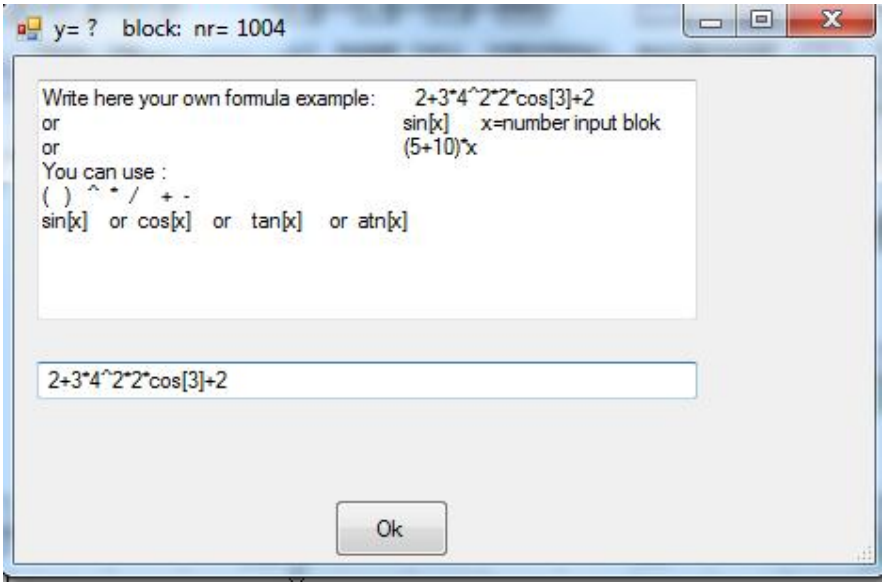


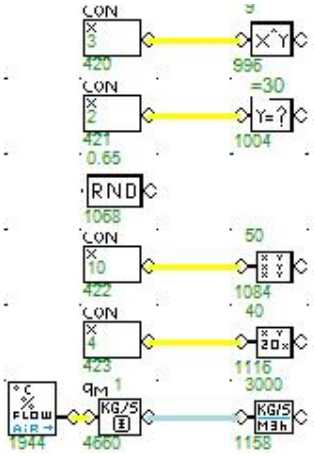
First Row : Digital Blocks



Second Row Arithmetic







^ Power

Write here your own formula example:
(5+10)*x x=input from other block

Random number

Table 3*x 3*y 1 input 1 output

Table 21*x 21*y 1 input 1 output

Works only with block KG/S
1 kg/s > 3000 m3/h

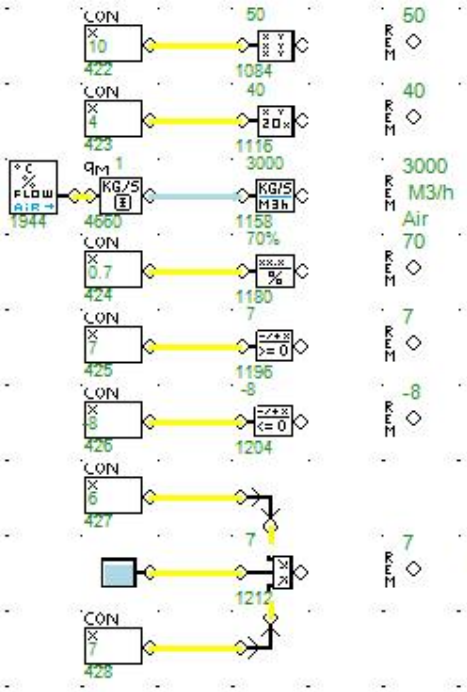


Table 3*x 3*y 1 input 1 output

Table 21*x 21*y 1 input 1 output

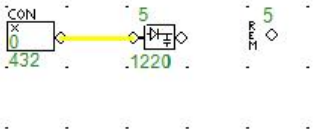
Works onlv with block KG/S
1 kg/s > 3000 m3/h

Decimal > % Example 0,4 > 40%

Example 7 > 7 but -8 > 0

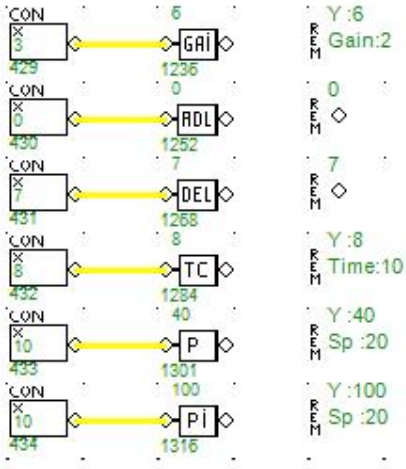
Example -8 > -8 but 7 >0

Bit block change active input



Trigger block
If input > 0 then trigger block
get value input

Third Row Controlling system and water blocks Sources e.g



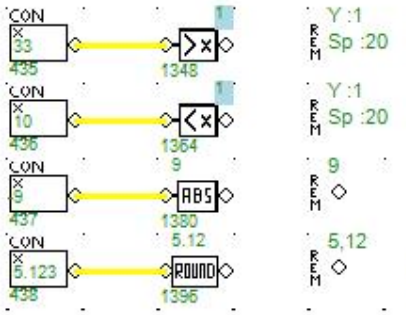
One interval back

Several intervals back

Timeconstant

P controller

PI Controller



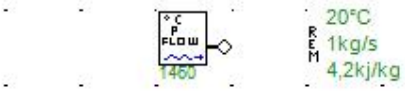
High Switch

Low Switch

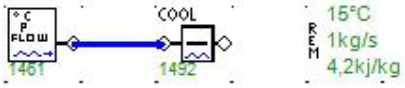
-9 become 9

Rounded
Decimal places

Band if input is between 19 and 21
then output =1



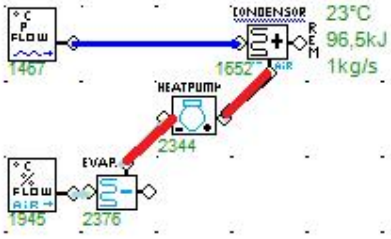
Source Water



Cooling Water

Heating Water

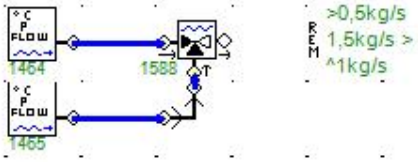
Pump Water



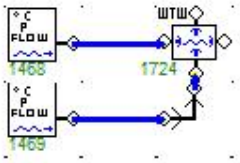
Heat Pump Water

Important connection lines must be directly from Evap to Heatpump and Heatpump to Condensor !!!!!!!!!!!!!!!!!!!!!!

Spit Valve



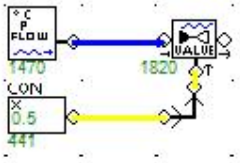
Mixing Valve



Heat Regeneration Water

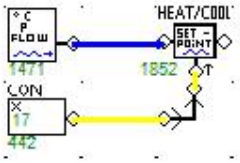
Con Block give value to Source for Flow

Con block gives value to Source for Temperature



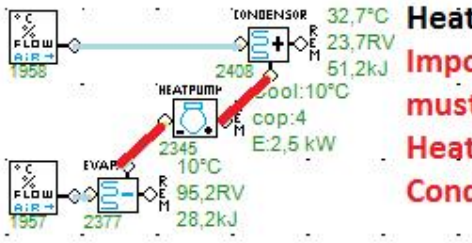
Con block gives signal to Control Valve to Open 0,5=50%

Could also be a P Controller etc.



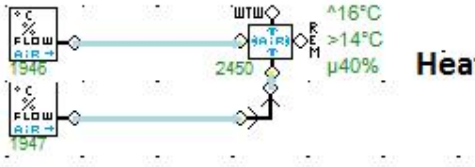
Con block gives value Setpoint Heat/Cool block

Row 4 : air treatment

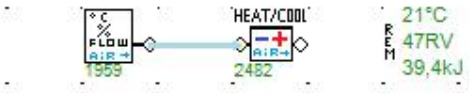


Heat Pump air

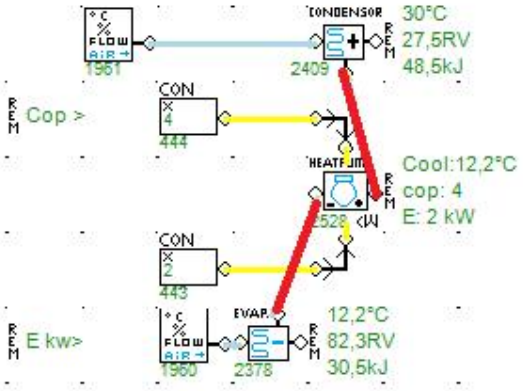
Important Connection Lines must be direcly from Evap to Heatpump and Heatpump to Condensor



Heat Regeneration Air



Heat/Cool Block



Heat Pump air

Important Connection Lines must be direcly from Evap to Heatpump and Heatpump to Condensor

Outside you can give Cop value and Power to Heatpump

Source air

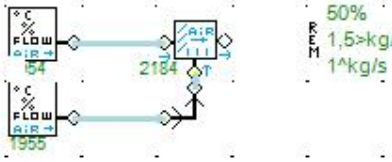
cooling Air

Heating air

Humidify Air with Water or Dehumidify Air

Humidify Air with steam or Dehumidify Air

Fan Air Pressure raised



Mixing Air Valve

Split Air Valve

setpoint %RH for water humidifier

setpoint &hr for Steam humidifier

REM 20°C 50RV 4 kg/sec

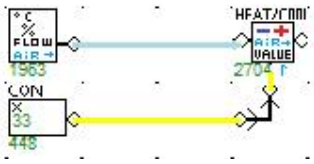
Con block give value Flow to source

REM 20°C 50RV 38,4kJ

con block give value Temperature to source

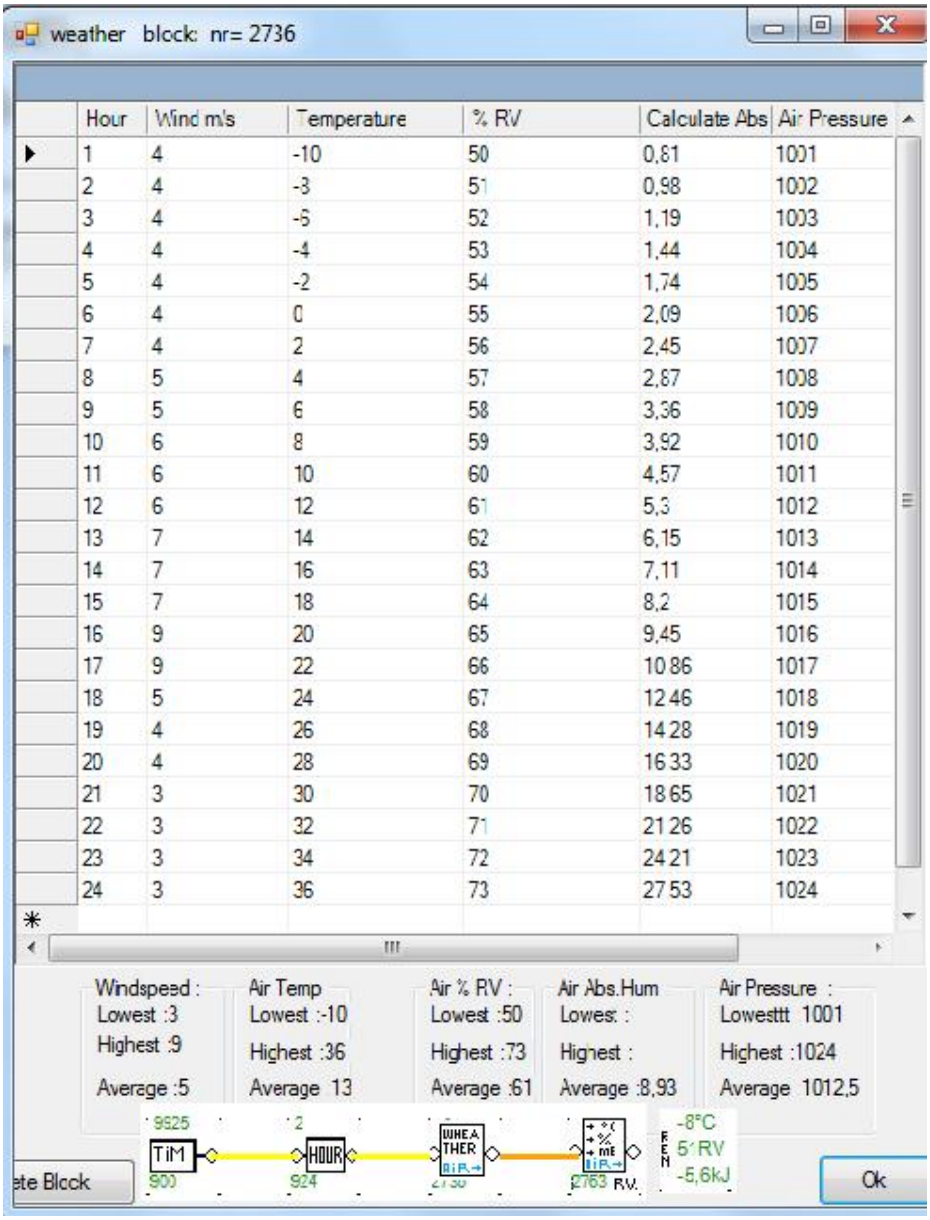
REM > 6 kg/s x:0,6

Con block gives signal to control Valve to open 0,6=60%
Could also be a P controller



REM 33°C 23,2RV 51,6kJ

Con block gives value Setpoint Heat/Cool block



Weather 24 Hour Simulation

Examples

To make a weather-depending systeem for different condition

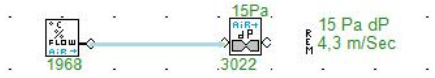
From time > Hour then input wheather Block

From this arithmetic block a line to Source with input Weather

You have now a compleet simulation system.

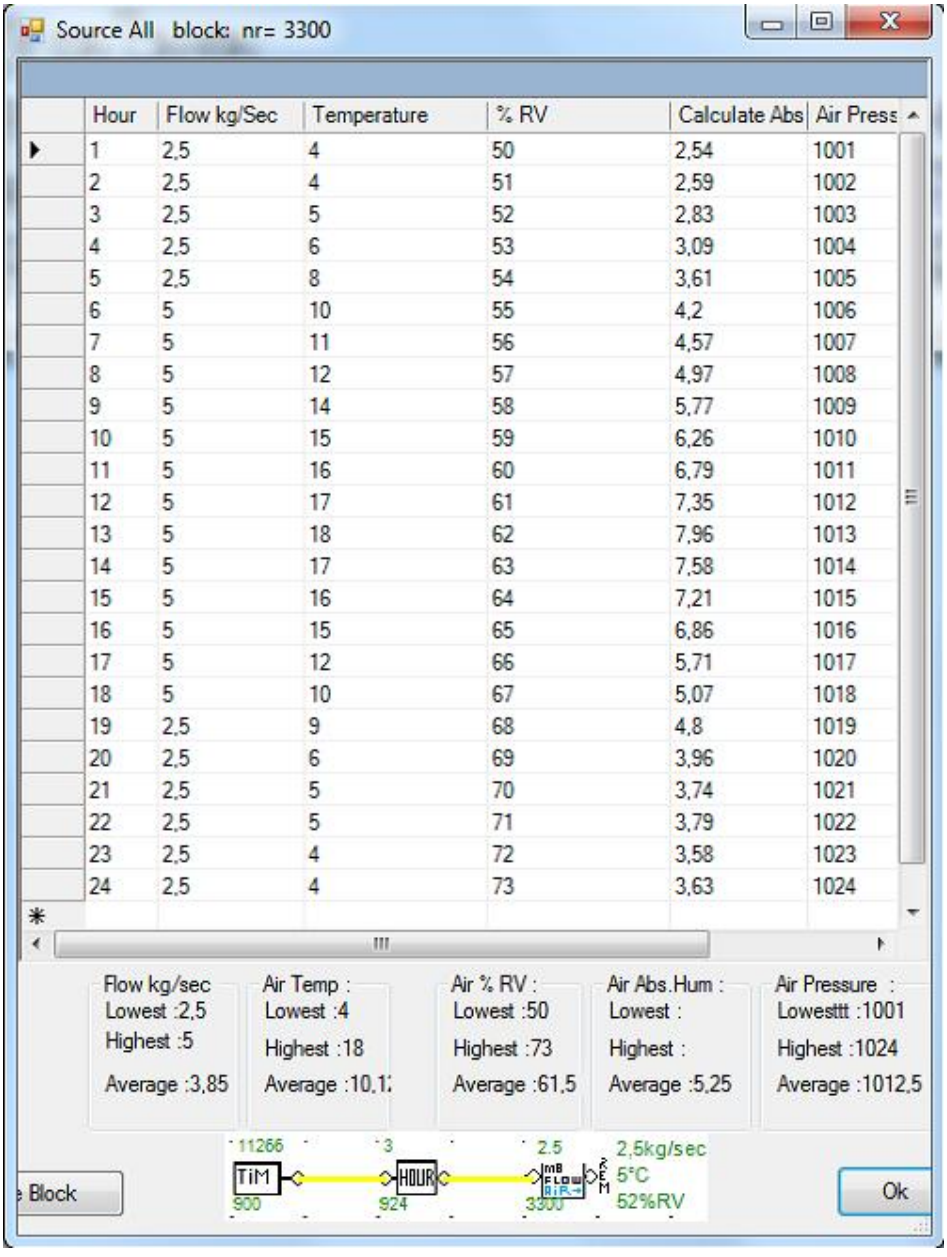
That you use as input for Air Conndition Installation Made with 4 blocks in a just a minute !!!!!!!!!

Airduct Resistance input diameter and lenght



Resistance different "heater etc"
input diameter and zeta Friction faktor

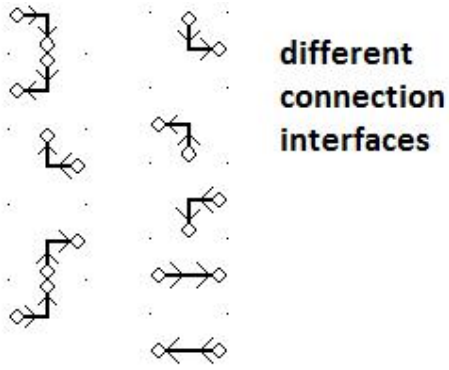
Resistance Filter input
m2 filter and Filter faktor

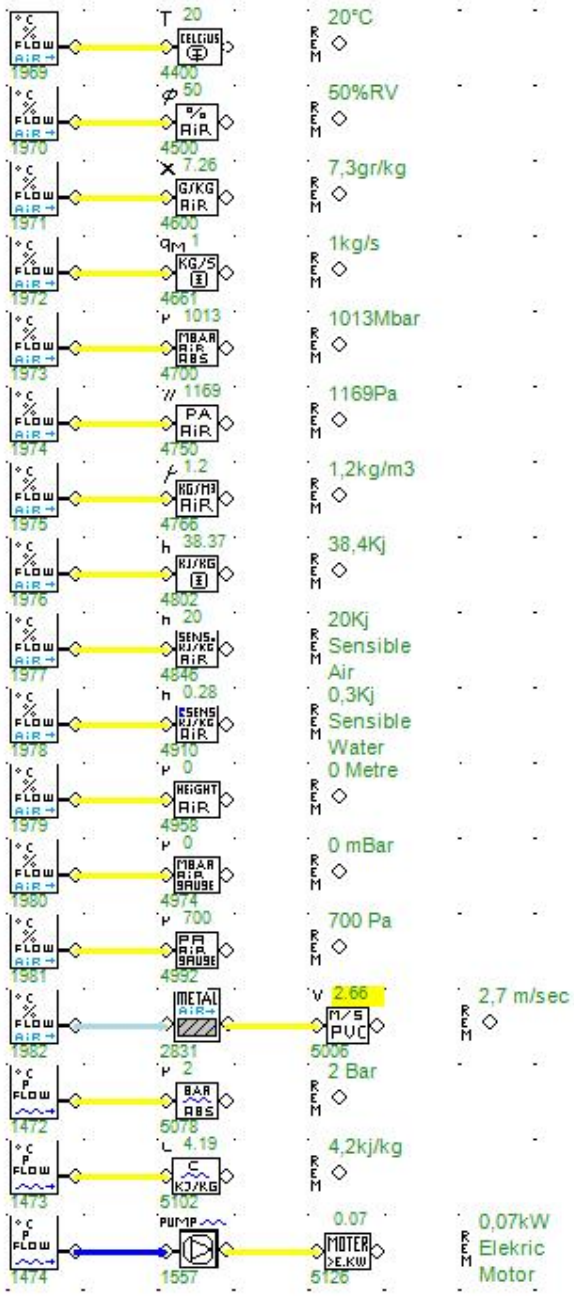


Input Condition Air 24 Hour Simulation

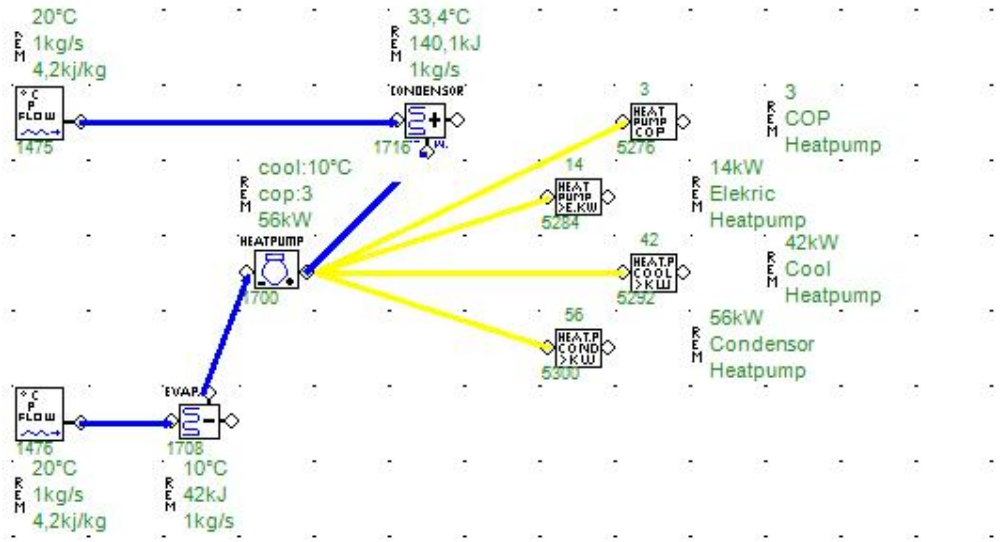
Example
To make a Time-depending systeem for different condition
From time > Hour then input Source All Block
From this arithmetic block a line to Source with input Source All
You have now a compleet simulation system.
You can change the flow each hour.
You use it as input for Air Conditioing
Installation Made with 4 blocks in a minute

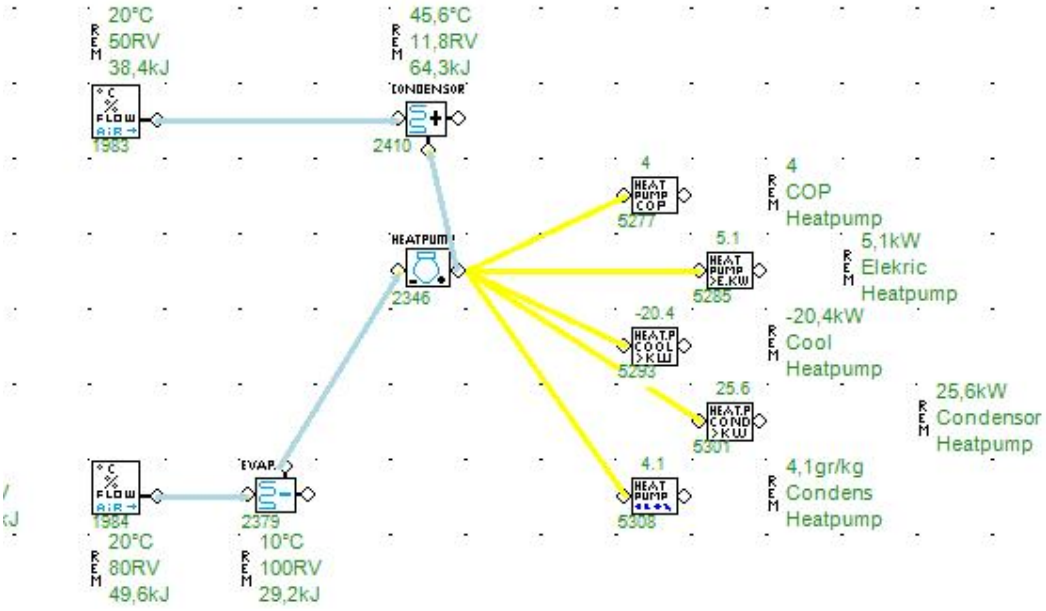
Row 5 : General Helping blocks





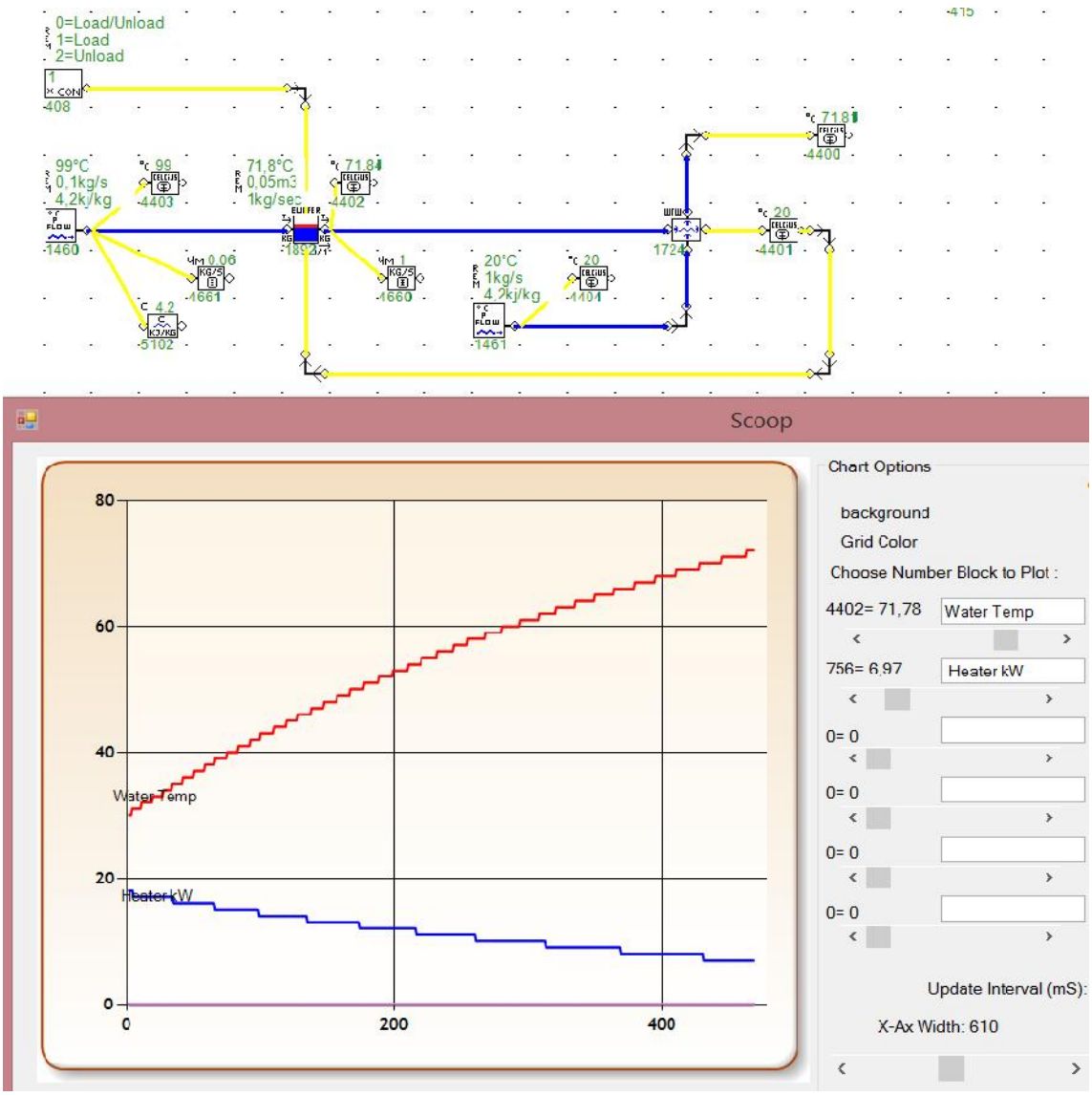
Row 6 : General Helping blocks Remark block


20°C
1kg/s
4,2kj/kg
1475
33,4°C
140,1kJ
1kg/s
CONDENSOR
1716
3
HEAT PUMP COP
5276
3
COP
Heatpump
cool:10°C
cop:3
56kW
HEATPUMP
1700
14
HEAT PUMP >E.KW
5284
14kW
Elekric
Heatpump
42
HEAT.P COOL >KW
5292
42kW
Cool
Heatpump
56
HEAT.P COND >KW
5300
56kW
Condensor
Heatpump
EVAP.
1476
1708
20°C
1kg/s
4,2kj/kg
10°C
42kJ
1kg/s


20°C
50RV
38,4kJ
1983
45,6°C
11,8RV
64,3kJ
CONDENSOR
2410
4
HEAT PUMP COP
5277
4
COP
Heatpump
HEATPUM
2346
5.1
HEAT PUMP >E.KW
5285
5,1kW
Elekric
Heatpump
-20.4
HEAT.P COOL >KW
5293
-20,4kW
Cool
Heatpump
25.6
HEAT.P COND >KW
5301
25,6kW
Condensor
Heatpump
4.1
HEAT PUMP
5308
4,1gr/kg
Condens
Heatpump
1984
EVAP.
2379
20°C
80RV
49,6kJ
10°C
100RV
29,2kJ

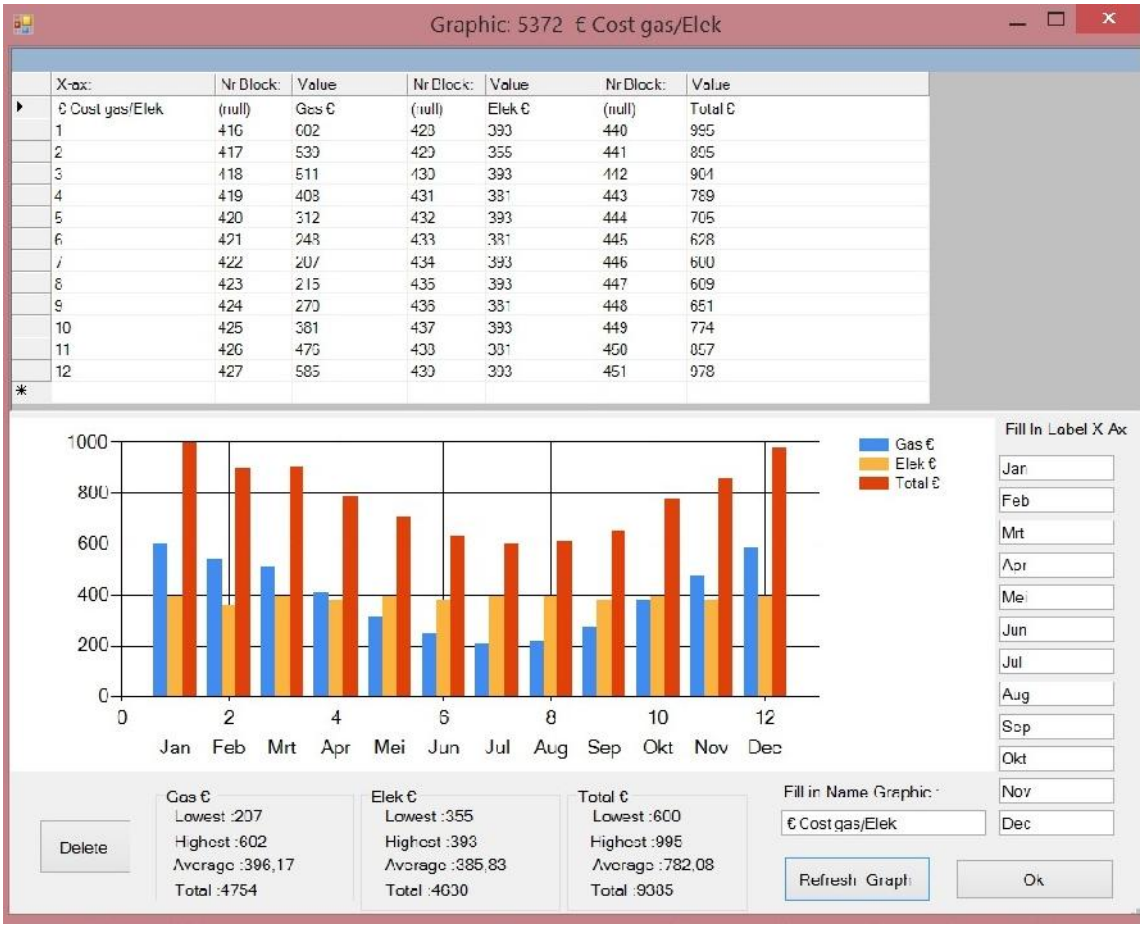
New:
Make you own buffer for Load/Unload Energy.

3 states :
0=Load/Unload
1=Load
2=Unload

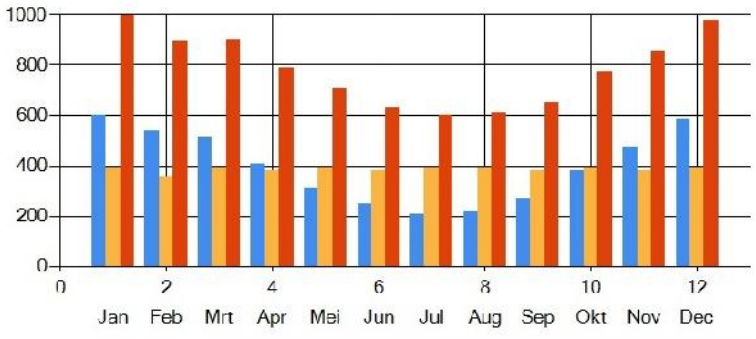


New nice Excel compatible Graphic see next.

Easily transport data to Excel
Just control a then control c
and then in excel control v



X-ax.	Nr Block.	Value	Nr Block.	Value	Nr Block.	Value
€:Kosten gas/Elek	(null)	Gas €	(null)	Elek €	(null)	Total €
1	416	602	428	393	440	995
2	417	539	429	355	441	895
3	418	511	430	393	442	904
4	419	108	431	381	443	789
5	420	312	432	393	444	705
6	421	240	433	381	445	620
7	422	207	434	393	446	600
8	423	215	435	393	447	609
9	424	270	436	381	448	651
10	425	381	437	393	449	774
11	426	476	438	381	450	857
12	427	585	439	393	451	978



Fill In Label X-Ax

Jan
Feb
Mrt
Apr
Mei
Jun
Jul
Aug
Sep
Okt
Nov
Dec

Delete

Gas €
Lowest :207
Highest :602
Average :396,17
Total :4754

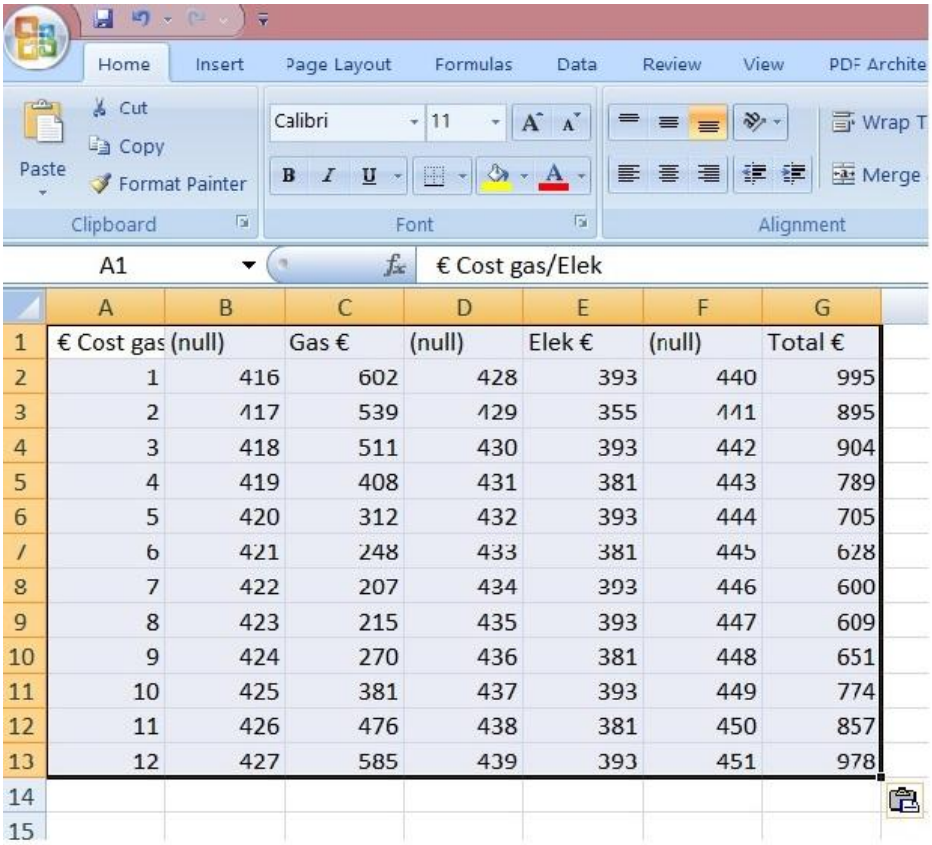
Elek €
Lowest :355
Highest :393
Average :385,83
Total :4630

Total €
Lowest :600
Highest :995
Average :782,08
Total :9385

Fill in Name Graphic :
€:Kosten gas/Elek

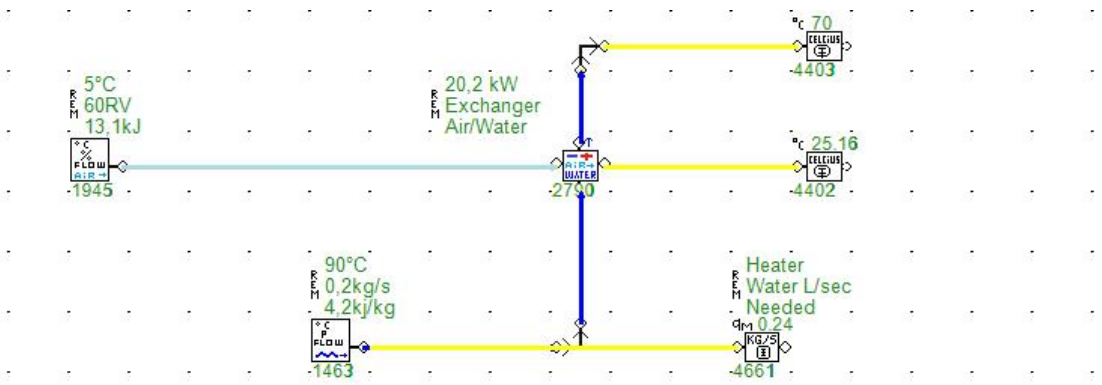
Refresh Graph

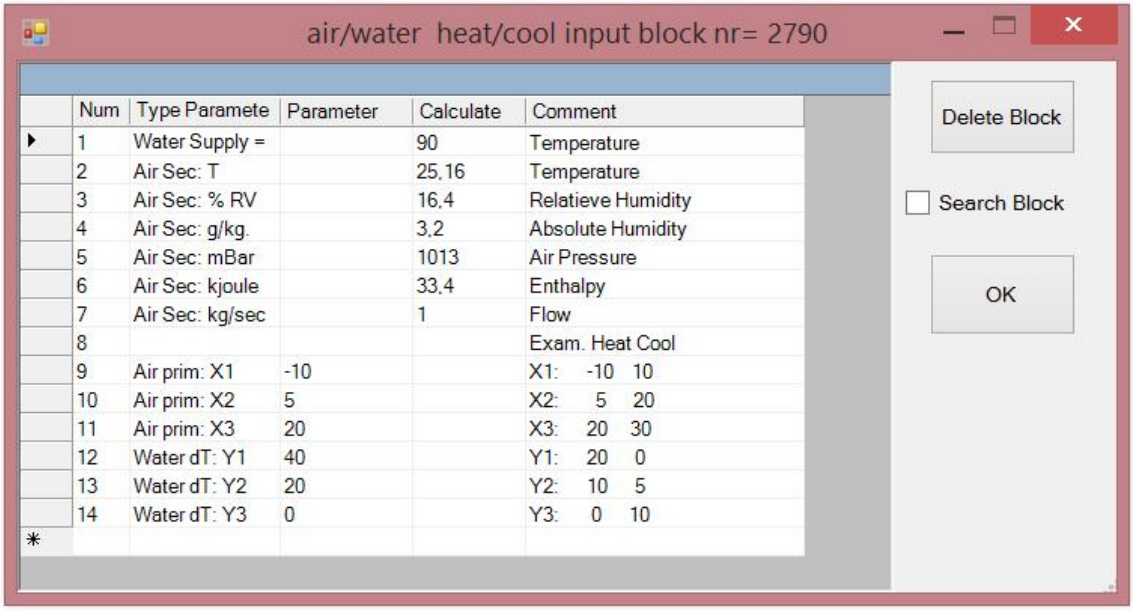
Ok



	A	B	C	D	E	F	G
1	€ Cost gas	(null)	Gas €	(null)	Elek €	(null)	Total €
2	1	416	602	428	393	440	995
3	2	417	539	429	355	441	895
4	3	418	511	430	393	442	904
5	4	419	408	431	381	443	789
6	5	420	312	432	393	444	705
7	6	421	248	433	381	445	628
8	7	422	207	434	393	446	600
9	8	423	215	435	393	447	609
10	9	424	270	436	381	448	651
11	10	425	381	437	393	449	774
12	11	426	476	438	381	450	857
13	12	427	585	439	393	451	978
14							
15							

New Air/Water exchanger with input curve.
Easy to make you own Air Handling plant.





Control Program:

Models Apply:
Choose File and then File open one of the examples.
E.g. Model from folder c: \ hvac_data\hvac
file Humidify.
if jou click with right mouse on the middle of a block
then become a new form .
Choose block humidifier (block with water drops).
Click under field parameter (default value 2) and gives it
another value 1
and confirmed it with enter. Click afterwards on ok.

Now 1 g/kg is moistened.
When you click with the left mouse on the middle of a block
then you see rapidly the value of the block
you can not change something.
The block left of block-system cool (row 4)
is a source block.(C '% P).
Here can establish you temperature, flow, %rv of air.
Click with the right mouse on the middle of a block source
then becomes there a form.
Click with the left mouse now under parameters on temperature.
The default value 20 stands there changes these in 30 then
Enter key and click on okay.
Now everything going calculated the outcome after block
moistening change.

Self making Models:

Making self models:
With the left mouse choose you a block from the library
above to the window.
Click with the left mouse in the middle of the block
hold mouse press and drag the block to
the middle off the window and then drop.
Choose block con. This is block with a constant value.
If you click on this in the middle of the block with the
right mouse then open a form click under field parameter
and give it 8 and a return.
Afterwards click on button okay.
Choose another block and give the value 2.
And place it it under the other block.
Choose now the Sum block and place it Right of the
other blocks.
Now we make a connection between the blocks:
With the left mouse double click in the middle
of block con (now appears a radiobutton right outside of the block) .
Now click on the radio button.Then another circle in the radiobutton appears.
Now afterwards double click with the left mouse on
the middle of the block SUM. Also a radiobutton appears.
(when jou make a mistake click in the empty field the
radio buttons disappears).
Click with the left mouse on the radiobutton left from the sum block.
Now a line appears between block CON and connected
to block SUM.
Then make also a connection between block CON
and to SUM.
Now appears number 10 above the block SUM.
If you click with the left mouse on the block
you get also a tool tip to see 2+8 = 10

You can not connect all the blocks:

Because it is a hybrid simulation.

Row A: Digital Blocks
Row Two: Arithmetic blocks
Row Three: Control order also 1 block etc.
Row Four: Air
Row Five: General help for blocks and connections
Row Six: General help for blocks and connections

Rem Block: Can you give comments.
Well you can using some blocks eg an analog
value is a digital value.
Eg make between a block and a con highest value block
> X when a connection block con is a number> 20 then
a digital 1 appears at the output of
the highest value block.
Of row 5 so you can get the temperature of an air stream.
Select a source eg first block in row 4 and connect it
with the "thermometer" block row 5 .
Then you get 20 degrees filtered.
Do the same with rv block will get 50% rh.
With these results you can count again with computational blocks.

Removing Blocks:

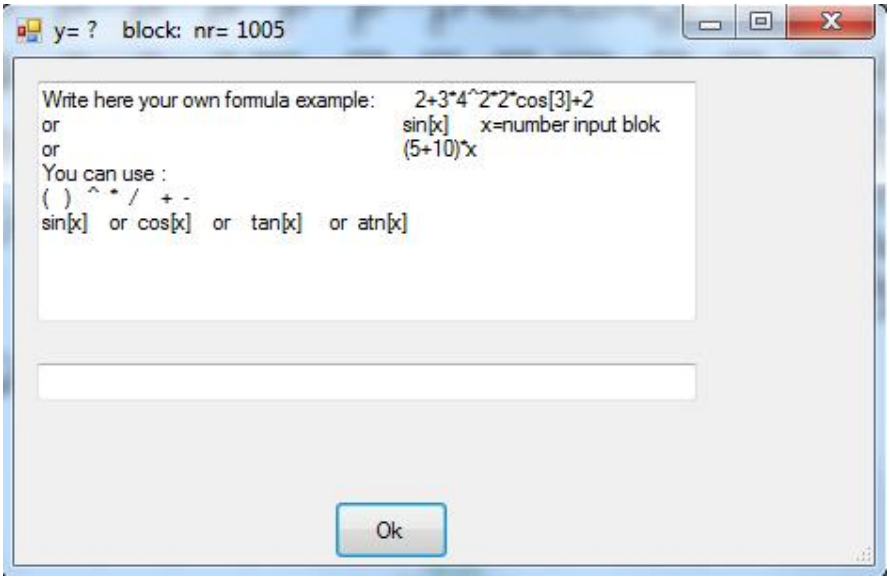
Click with the right mouse button on a block and choose delete block.
Now the connector automatically removed.

Delete horizontal lines :

Click on Menu Edit then you can click delete Line (checked on).
That means that you can delete line.
Example :
Put a block con and a sum block on the field.
Make a line between con and sum.
Click with the left mouse on block con after that
click on a the empty place on the field with the left mouse.
The line between block con and block sum disappear now.
Don't forget do click once more on Menu delete line to (checked off).
When you are ready do delete line's.
General:
All inputs are on the left and right output center.

Only marker has 4 inputs and a separate block merker_out the
output of the marker.

Math Functions Block Own Formula y= ?



Function Description
Cos Returns the cosine of a specified number (angle)
Sin Returns the sine of a specified number (angle)
Tan Returns the tangent of a specified number (angle)
ATan Returns the atangent of a specified number (angle)
Exp Returns e raised to a power

Heatpump:

To connect connections Heatpump see example:
Choose from folder c:\hvac_data\hvac
heatpump.
You must direcly connect line between evaporator an heatpump also Heatpump and condenser !

Various Settings:

Can be found under Settings menu.

Interval time
Include interval time in seconds for calculations simulation.

Tooltip
The time that a ToolTip appears when the left mouse click on a block can be set here. You can also check if it does not want to see useful if you create a new model.

New Changes :

version 2.41

Bargraph can you make with line to another block
but now also with click right mouse on bargraph block en
give a nr block in.
Advantage you see no lines expactilly in graphic picture.

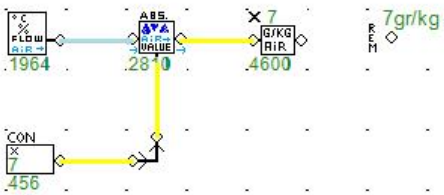
version 4.76

Rem block :
Beside text you can also received value from a other block.
Right mouse click on the rem block and give the number nr.block in .
And click on ok button.
Also you can make a line now from the rem block to e,g sum block.
Left clicked with mouse radio button appears and then click on the radiobutton
And then click on the sum block .Also a radiobutton appear ,click on it and you have
Connected you blocks Now you can calc with the value from a Rem block.

version 5.51

Pickup >
Blocks>

Put a pickup block into the field.
Put some other blocks into the rectangle
Then with the right mouse
click on take blocks
Now with the left mouse you can
Move all the blocks .
After you find a other place
You can click on ok to
Put the blocks fixed.
This is specially useful if you made a large model
and large distances to the blocks dragging.

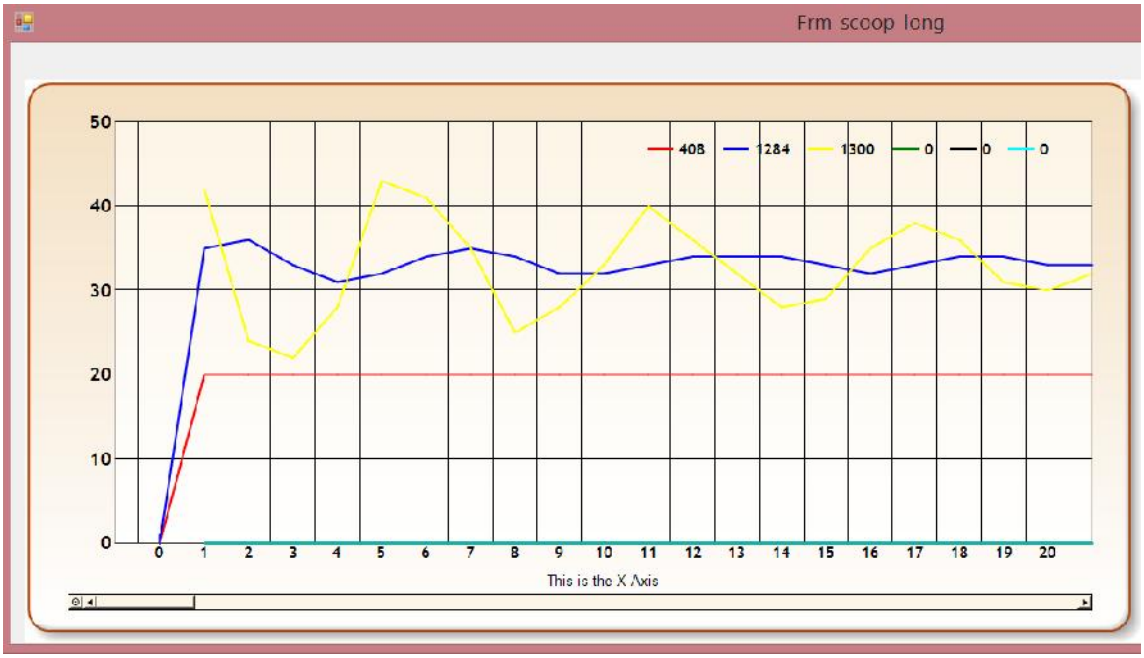


Give setpoint abs humidity
eg 7 then the air get 7 g/kg

Move
Blocks

Put a Macro block into the field.
Then click on move block then you have put the macro model
On the field.
You can now also got a picture from map macro
Menu File open background image
Choose a picture from map Macro.

New Scoop Long: For long proces situations



New polar chart for control Proces etc.

If you have problems or questions
You can always contact me

Piettadema@gmail.com

Success with this program.